He then continues:—

> The propagation of Light occurs, as we have already seen, by dynamical undulations, for so we call the uninterrupted alternation of the opposing forces. This view stands between the Undulatory theory which Huygens and Euler taught and the Emanation theory of the Newtonian school, almost in the same way as the dynamical theory of Heat between the mechanical and electrical theories. Schelling, in his *Weltseele,* has recognised the possibility of such a view.

Besides these extracts from the "Ansicht der chemischen Naturgesetze," Oersted expounded his theory of light in a particular communication which he made to the Royal Danish Society of Science, and of which an abstract is printed in its Proceedings for the year 1815–16, pp. 12–15. One sentence will suffice as a summary of this abstract:—

> According to the theory which has been set forth here, one may fairly well consider a ray of Light as a succession of immensely small electric sparks which might be called the elements of Light.

It is evident that, with all his ingenious insight, Oersted was far from having formulated an electric theory of light in terms which would admit of verification. His perception that electric forces were called into play in the displacements of the luminiferous waves was obscured by the view which he held of conduction; for, surely, the condition of the quasi-elastic actions called forth in the propagation of light should have been that the forces or agencies at work must *not* attain so great a value as to produce a discharge, as we now understand it. Indeed, in the existing state of knowledge, when as yet the quasi-elasticity of dielectrics was unknown, the foundation facts for an electric theory were not available. The remarkable fact is that in the paucity of available facts his speculations took him so far as they did along the road of progress.

SILVANUS P. THOMPSON.

SCIENCE AND RESERVATIONS.[1]

WHEN a district interesting to geologist and naturalist alike is handed over to a body of scientific investigators, the result in these days of intensive research is likely to be important. Dr. Conwentz, the indefatigable pioneer of nature-protection, has edited a volume of 700 pages, which gives the results of such a study in the case of the *Plagefenn* at Chorin, in Prussia, a district of marshes, lakes, islands, and wooded country. Of course, there are gaps in the mass of knowledge accumulated during several years, in the fauna and lower flora, for instance. But the whole work is a remarkable study in classification and generalisation.

The relations of water and earth, for which the historical records of the district are very useful, have seldom been studied so minutely, especially in reference to the lower vegetation. Dr. H. Schroeder describes the diluvial, and Dr. J. Stoller the alluvial, structure. On their foundations, Dr. E. Ulrich bases his botanical study. This, and the monograph on the fauna, are fine studies. As contributions to ecology they are of great value. Many readers should be able to obtain a better idea of the intricacies of plant communities from such a monograph as Dr. Ulrich's than from a general work on the subject. The sociology of plants and animals, as conditioned and initiated by geological and meteorological forces, has still all the fascination of a young science. Excellent diagrams and maps illustrate the social processes, so well marked in this district, which Dr. Ulrich praises as a model of biological complexity and natural beauty. Professor Kolkwitz's essay on the plankton is placed at the end of the volume, but should be read with Dr. Ulrich's contribution.

The account of the fauna could not have been in better hands than in those of Prof. F. Dahl. His general introduction on methods of research and his conclusions on the relations between animal and plant communities are fresh and important.

The analytical lists are carefully executed; that of the fauna extends to more than 200 pages. The index is a good one.

The keynote of the whole study, and the point of departure and of arrival alike, is the coast-line of a fresh-water lake; and there are few more interesting sites for the study of organic life. Our own country, it may be observed, has an abundance of similar districts, more or less useless to the agriculturist, but of enormous value for scientific research.

A. E. CRAWLEY.

NOTES.

ARRANGEMENTS have been made for the inclusion of two organised discussions in the proceedings of Section H (Anthropology) during the forthcoming meeting of the British Association at Dundee. On Friday, September 6, a discussion on the ethnological aspects of Scottish folklore will be opened by Mr. W. Crooke, president of the Folklore Society, and papers will be contributed by Mr. E. S. Hartland, Mr. W. J. Brodie-Innes, and Canon J. A. McCulloch. On Monday, September 9, the president of the section, Prof. G. Elliot Smith, F.R.S., will read a paper on the distribution of megalithic monuments, in which he will develop the theories as to the racial affinities of their builders which he has recently put forward. In the discussion which will follow, Prof. Ridgeway, Prof. J. L. Myres, Prof. W. Boyd Dawkins, Dr. T. Ashby, and others have promised to speak.

THE summary of the weather issued by the Meteorological Office for the week ending August 24 shows that the general conditions were again extremely unsettled over the United Kingdom as a whole, but in some localities in Scotland, Ireland, and the north-east of England rain is said to have been less common than elsewhere. The deficiency of temperature exceeded 3° in most districts, and the south-west of England was the only district where the highest day temperature touched 70°. The radiation temperature on the grass fell below the freezing point at several places in different parts of Great Britain. The rainfall was above the average in all districts except in the west of Scotland, and in the south-west of England the measurement was as much as three times the average. Bright sunshine was everywhere very deficient. In the south-west of England the mean daily duration was less than two hours, and in the south-east of England, where there was more sunshine, the duration was little more than three hours. The summary of the weather for the current week will show very similar conditions to prevail, with a greater excess of rainfall over nearly the entire kingdom. The rainfall of 6 inches in less than twelve hours at Norwich on August 26 is one of the heaviest falls which have occurred in so short a time in England.

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[1] "Beiträge zur Naturdenkmalpflege." Herausgegeben von H. Conwentz. Dritter Band—"Das Plagefenn bei Chorin." Ergebnisse der Durchforschung eines Naturschutzgebietes der preussischen Forstverwaltung, By H. Conwentz, F. Dahl, R. Kolkwitz, H. Schroeder, J. Stoller and E. Ulrich. Pp. xvi+688. (Berlin: Gebrüder Borntraeger, 1912). Price 18.75 marks

IN Australian papers which have just come to hand we regret to see the announcement of the death of Mr. Francis James Gillen. Anthropology has thus lost a conscientious and devoted worker, whose world-wide reputation has been well earned in a fast-vanishing field of investigation, which, unfortunately, attracts far too few men of Mr. Gillen's type. It is now forty-five years since he entered the public service of South Australia, and his official work caused him to become virtually exiled to the heart of the Australian continent; but he devoted his spare time to the study of the aboriginal people amongst whom he lived, and it is no exaggeration to say that he acquired a much more intimate knowledge of the customs and beliefs of the most backward race of mankind now in existence than all other investigators had been able to collect; and this wealth of accurate information was put to the best use when Mr. Gillen collaborated with Prof. Baldwin Spencer, F.R.S., of Melbourne, and produced a series of the most discussed volumes that have ever been contributed to ethnological literature. The opportunities for such investigations as Mr. Gillen carried on are abundant, but with the rapid intrusion of European customs into every corner of the world they will soon be gone for ever. It is thus with especial gratitude that all students of mankind will always regard the labours of such men as the late Mr. Gillen, who have seized the opportunities presented by their daily occupations and rescued for posterity an accurate knowledge of the fast vanishing customs and beliefs of primitive peoples.

DR. JEAN MASCART, of the Paris Observatory, has been appointed director of the Lyons Observatory in succession to M. André.

IT is announced in the *Revue Scientifique* that M. E. Solvay has given 400*l*. to the Institute of Physical Chemistry of the Berlin University to assist the researches on which Prof. Nernst is engaged. The gift will be renewed for three years.

THE collection of foreign Lepidoptera bequeathed by the late Mr. H. T. Adams, of Enfield, has been received at the Natural History Branch of the British Museum. It is contained in 68 cabinets, and is stated to comprise about 150,000 specimens. The estimated value of the collection is between 40,000*l*. and 45,000*l*.

THE death is announced in *Science* of Prof. E. L. Richards, emeritus professor of mathematics of Yale University, aged seventy-four years; and of Dr. M. H. Richardson, Moseley professor of surgery at Harvard University, aged sixty-one years.

MR. CHARLES EDE, who was surgeon and naturalist to H.M.S. *Assistance*, which took part in one of the expeditions in search of Sir John Franklin's party in the Arctic region, has just died in his ninetieth year.

THE death is announced, in his eighty-first year, of Mr. Alexander Dean, senior lecturer on horticulture to the Surrey County Council, and a well-known authority on horticultural matters. Mr. Dean received the Victorian Medal for Horticulture. He was a frequent contributor to periodicals dealing with gardening subjects, and the author of a useful little book on vegetable culture.

THE death is announced of Prof. John Craig, one of the leading American horticulturists. He was born in 1864 in the province of Quebec, but received his education at the Iowa State College. He returned to Canada in 1890 to become horticulturist at the Dominion experiment station at Ottawa. In 1899 he once more crossed the border to take up an appointment as professor of horticulture and forestry at the Iowa State College. Since 1903 he had held the chair of horticulture at Cornell University. He was the editor of *The National Nurseryman*, and the author of a text-book of practical agriculture.

WE notice with regret the death, on August 25, in his sixtieth year, of Dr. Andrew Wilson, lecturer on physiology and health to the George Combe Trust and Gilchrist Trust lecturer. In 1876 Dr. Wilson was appointed lecturer on zoology and comparative anatomy at the Edinburgh Medical School; and he was at one time editor of *Health*. But Dr. Wilson was best known as a popular lecturer and writer on scientific subjects, in which capacity he did very useful work in making clear and interesting to general readers and the ordinary public the results of research in various departments of natural science specially. He was the author of a large number of popular books on scientific subjects.

WE regret to see the announcement of the death on August 26, at sixty-one years of age, of Mr. Clinton Thomas Dent, vice-president of the Royal College of Surgeons, honorary member of the Philadelphia Pathological Society, and late Hunterian professor and member of the Court of Examiners of the Royal College of Surgeons. Mr. Dent was the author of a number of surgical works, and was famous as an Alpine climber, and also for a series of explorations in the Caucasus. He was secretary of the Alpine Club from 1878 to 1880, vice-president in 1884, and president from 1886 to 1889. He took a large part in editing the mountaineering volume of the Badminton Library, and was also the author of a volume entitled "Above the Snow Line," published in 1885.

WE notice with regret the announcement of the death, at eighty-six years of age, of Mr. A. Brothers, of Manchester, one of the oldest photographers in England, and the author of several important works upon photography. Mr. Brothers was the inventor of the use of magnesium ribbon for flashlight photography, and he obtained some of the earliest photographs of the solar corona. Several hundred photographs were taken during the American eclipse of August 7, 1869, and one of them was reproduced in the first number of NATURE, but it shows only the chromosphere and prominences. During the eclipse on December 12 of the following year excellent photographs of the solar corona were taken by Mr. Brothers at Syracuse, and also by American observers in Spain. A woodcut reproduction of one of Mr. Brothers's pictures appeared in NATURE of February 23, 1871, and some points of interest were indicated by him in an article in that number and in the issue of March 9, 1871. The photographs were of great scientific value in connection with the then much-discussed question as to the nature of the corona.

DR. T. B. MCCLINTIC, of the American Public Hospital and Marine Hospital service, has died at the early age of thirty-seven, the victim of his own devotion to the cause of public health. For the last two years he had been investigating "Rocky Mountain spotted fever" in Montana, a disease most prevalent in the Bitter Root Valley. Dr. McClintic's campaign against the epidemic had prevented the development of any case in the valley this year until he was himself stricken. He had done much notable work in his previous career. He served on the relief ship after the San Francisco earthquake, assisted in administering the plague quarantine in the Philippines, and, in conjunction with Dr. Anderson, of the hygienic laboratory, set the standard for antiseptics in the United States. The New York *Evening Post*, in a leading article, says that Dr. McClintic's name "will be added to the illustrious roll of men who have cheerfully faced dangers more appalling than those of battle, and have yielded up their lives in the effort to save the lives of others."

WE regret to have to record the death of the Rev. Robert Ashington Bullen, who passed away suddenly on August 16, aged sixty-two. He was an enthusiastic naturalist, a Fellow of the Linnean, Geological, and Zoological Societies, and an active member of council of the Palæontographical and Malacological Societies. He was a generous supporter of scientific research, especially in geology, and either inspired or himself made numerous contributions to knowledge. He was closely associated with the late Sir Joseph Prestwich at the time when he was preparing his classic paper on the supposed worked flints from the plateau gravels of Kent; and Mr. Bullen himself subsequently published many descriptions and illustrations of "eoliths" both from Kent and other districts. He explored a prehistoric cemetery at Harlyn Bay, Cornwall, and described his results in a small work, of which the first edition appeared in 1901, the third edition quite lately. He visited the Bermuda Islands, of which he contributed a useful geological description to *The Geological Magazine* in 1911; and at the time of his death he was occupied with the study of material which he had collected from superficial deposits in the Canary Islands.

WE also note with regret the death of Captain Arthur William Stiffe, who had been for many years a familiar figure at the meetings of the Geological and Royal Geographical Societies. Capt. Stiffe was born in 1831, and during service in the Indian navy from 1849 to 1862 was chiefly occupied with hydrographic surveys of the Persian Gulf and the Mekran coast. In 1873 he read to the Geological Society an account of the mud craters and geological structure of the Mekran coast, from which he was one of the first to collect the now well-known fossiliferous nodules of Upper Tertiary age.

As already announced, the autumn meeting of the Iron and Steel Institute will be held at Leeds on September 30—October 4. The provisional list of papers expected to be submitted includes the following subjects:—The solubility of cementite in hardenite and the solubility or diffusion of hardenite in ferrite; gases evolved on heating steel to its melting point in a vacuum; allotropy in general and that of iron in particular; the thermal-magnetic transformation of 25 per cent. nickel steel; a new method of revealing segregation in steel ingots; magnetic properties of manganese and nickel steels; the manufacture of open-hearth steel; the growth of cast irons after repeated heatings; and the iron ores and mineral resources of Chile.

IN the August number of *Man*, Mr. D. Wright describes the ceremonies at the burial of a chief in Rhodesia. When he dies during the winter months, the body will not be buried until after the first rains fall, and meanwhile it remains in the hut in which the chief died, where it is laid on a platform in charge of the friends, who sweep the floor and keep the walls of the hut smeared with clay to prevent the escape of the spirit. A fire is kept burning in the hut, and when decomposition sets in there is a feast, and offerings are made to the spirit. When the first rains fall an ox is slain, and the skin is removed with the hoofs and head complete. The corpse is then sewed up in the hide, a grave is dug in an ant-hill, and the body is placed in it with the pots which were in the hut. The grave is covered and plastered over, a hole being left for the exit of the spirit. This spirit is then believed to take the form of a lion cub, which remains near the grave, and is fed by other lions which are the depositaries of the souls of former paramount chiefs.

THE Journal of the Royal Statistical Society for July contains an interesting paper by Mr. A. L. Bowley on the measurement of employment. Mr. Bowley points out the limitations of the present Board of Trade index-number for unemployment, and gives the result of an experiment in forming a fresh index-number which takes into account all the information of every kind bearing on the volume of employment published by the Board. In the same issue there is a note by Sir J. A. Baines summarising the census returns, either provisional or final, which have now been received from nearly all the units of the British Empire. The total population is rather more than 419,000,000.

THE Royal Statistical Society has just published a report of its special committee which was appointed to inquire into the system adopted in different countries for the registration of births (including stillbirths) and deaths with reference to infantile mortality. The information collected is both extensive and abundant, and the practices of various nations in reference to this question appear to be almost as numerous as the nations themselves. There is even difference of opinion with regard to the exact meaning of the word "stillbirth." It is not, however, possible for us to summarise all these details, and those of our readers interested in statistical methods in general, and the question of infantile mortality in particular, should procure the report. The main conclusion arrived at by the committee is that stillbirths should be tabulated separately. If this is done, the present basis of calculation for mortality in infants will be altered and the tables will be thus rendered much more satisfactory and trustworthy.

IN the *Victorian Naturalist*, vol. xxix., p. 43, Mr. J. Mahony records the occurrence of remains of the Tasmanian devil on the sandhills near Warrnambool, Victoria, in association with bones and teeth of man and other mammals. The occurrence of *Sarcophilus ursinus* on the Australian mainland at a very recent epoch is thus conclusively proved.

To the August number of *The American Naturalist* Mr. H. W. Fowler contributes an illustrated article on some features of the ornamentation in freshwater fishes, as exemplified by the development of tubercles on the head, or head and back, of males of the families Cyprinidæ (minnows) and Catostomatidæ (suckers) during the breeding season. These tubercles may develop in young fishes, provided they are sexually mature, as well as in adults, but in other instances adult fishes may breed without the tubercles appearing.

ACCORDING to an illustrated guide-book by Mr. T. Sheppard, Hull has established in the Pickering Park an exhibition devoted to the whaling trade formerly carried on from that port, as well as to matters connected with sea-fisheries and shipping in general. It is stated that the first whaler from Hull appears to have left that port for Arctic whaling in 1598, or only four years later than the first English vessel which sailed to hunt the Greenland whale. About the middle of the nineteenth century the industry began to wane; and the famous Hull whaler *Truelove*, which in her time had taken about 500 whales, made her last whaling voyage in 1868. The building in which the exhibition is contained is the gift of Mr. C. Pickering.

THE current number of the *Archiv für Zellforschung* (Bd. 8, Heft 4) contains a very interesting memoir by Dr. Henri Hoven dealing with the structure and function of glandular cells. The paper treats especially of the "chondriosomes," filamentous bodies which occur in the cytoplasm and exhibit characteristic staining reactions. The author considers that these bodies are identical with the chondriosomes described by Meves in embryonic cells. The latter are believed to be essentially formative bodies, at the expense of which myofibrillæ, neurofibrillæ, and other cell structures are differentiated. In glandular cells they are the active agents in the formation of the secretion, being, in some cases at any rate, actually broken up into the secretion granules. It seems probable that they have the power of multiplying by division. The author concludes that the bodies described by various observers as existing in glandular cells, under the terms vegetative filaments, basal filaments, ergastoplasm, ergastidions, and chondriosomes, are all one and the same thing.

AMONG the publications we have recently received through the courtesy of the director of Kew Gardens, mention may be made of appendix ii. and appendix iii. to the Kew Bulletin for 1912; the former contains a list of additions to the library at Kew during the year 1911, and the latter a list of new garden plants introduced last year. Of greater general interest is the new edition, just published, of the popular sixpenny Official Guide to the Royal Botanic Gardens, containing above a hundred pages of descriptive matter, interesting and plainly worded so as to be of value to the general public as well as to botanical students, with a small but admirably clear key-plan of the gardens.

MR. A. G. TANSLEY, of Cambridge University, has contributed to *The Gardeners' Chronicle* (Nos. 1336–8) an account of the vegetation of the forests of Provence, with seven excellent photographic illustrations. In his series of three articles, forming one of the most interesting of the purely botanical papers which have appeared recently in this journal, the author points out that within a space of about thirty miles all transitions may be traced between the typical Mediterranean coast vegetation and that of the high Alps. Since the underlying rock is almost everywhere limestone, the main factors differentiating the vegetation are climatic, and correspond with a decrease of temperature and an increase of moisture in passing from the low hills of the coast to the high mountains of the Maritime and Provençal Alps. The influence of aspect upon the vegetation is very striking, the cooler and moister northern slopes frequently bearing quite a different flora from that of the sunny southern slopes. The author distinguishes and describes four main forest zones: (i) the Mediterranean types of *Pinus halepensis* and *P. maritima*, with *Quercus suber* locally; (ii) a belt in which *Quercus pubescens*, a deciduous oak closely allied to *Q. sessiliflora*, is dominant; (iii) a belt of Scots pine extending into the subalpine region; (iv) forest composed of *Picea excelsa* and larch which form the uppermost belt, at least on northern slopes. The zonation is exceedingly well marked on the whole, though the four zones are, of course, much influenced by aspect, and there is a good deal of mingling in the transitional zones.

WE have recently received the Meteorological Report of the Survey Department of Egypt for the year 1909. Although somewhat belated, owing presumably to the careful discussion of so large an amount of data, a few general remarks will probably be of interest. The report is divided into two parts, as before: (1)

observations made at Helwan, the first order station of Egypt. The size of this part has been considerably reduced by the omission of observations for every hour and the publication of the results in a more summarised form. This part also includes an important paper by Mr. H. E. Hurst on the reduction of the observations of terrestrial magnetism. (2) Climatological tables, including rainfall and river gauge observations. The chief features of the year were the heavy rainfall in April and October, and the high Nile flood, which began early and was about 15 per cent. above the normal; the rainfall was, however, deficient in Egypt generally. With regard to relative humidities, it is found that the values in the Sudan computed from Jelinek's tables (Leipzig, 1903) not uncommonly fall below 10 or even 5 per cent. As it seems improbable that the surface air is ever so dry as this, the validity of the tables in extreme conditions is under consideration. A first order station for the Sudan is in course of formation at the Gordon College, Khartoum.

In a publication of the Egyptian Survey Department entitled "Magnetic Observations made during 1911 at the Khedivial Observatory, Helwan," particulars are given of the mean monthly and annual values of the magnetic elements at Helwan during 1911, and of the diurnal variations in declination and in horizontal and vertical intensity for each month and the year. Days of incomplete record and those of disturbance character "2," on the international scale, are omitted, the days actually utilised being 330 for declination, 317 for horizontal, and 291 for vertical intensity. Particulars are given of eight disturbances—occupying parts of thirteen days—in which the range of the horizontal intensity exceeded 0·001 C.G.S. The largest ranges observed were 0·00188 in horizontal intensity, 0·00044 in vertical intensity, and 11′ in declination.

We have received from the publishers (Messrs. A. Hermann et Fils) an interesting tract by MM. C. Jordan and R. Fiedler on convex closed curves, and others connected with them. The topic was suggested by questions of probability, and we are occasionally reminded of the work of Crofton, one of the great authorities in this field. But probability is not actually treated here; the main part consists of tangential polar formulæ and discussion of derived curves such as pedals, parallel curves, &c. On p. 34 there is an interesting figure such as is often produced in a street by one wheel of a cart which has twice turned round. Each turn generally involves a slight backing, and then the trace of the inner wheel contains two adjacent cusps and an ordinary node. Various examples due to Euler, Kepler, Newton, &c., are given as illustrations.

A method of detecting the presence of polarised light in the light from a sky obscured by thick clouds is described by Mr. A. E. Oxley in the July number of the Proceedings of the Cambridge Philosophical Society. It depends on the use of a Babinet compensator, with its principal direction set at 45° to that of the observing Nicol, and of a special rhomb in front of the compensator which allows part of the incident light to pass without change while it introduces a phase difference of $\pi/2$ into the remainder of the beam. When the edges of this rhomb are parallel to the principal direction of the Nicol, bands are seen in the field of view even when the amount of polarised light present is too small to produce colours in a selenite plate, and the apparatus also allows the mean plane of polarisation of the incident light to be ascertained.

In the June number of the *Bulletin de la Société d'Encouragement pour l'Industrie nationale*, M. A. Verneuil describes a form of muffle or crucible furnace suitable for laboratory work up to a temperature of 1600° C. If a crucible is to be heated, it is surrounded by a cylindrical block of refractory material which rests on a brick pillar and is provided with a lid which leaves openings for the escape of the burnt gas. The gas is introduced into the space between the crucible and its surrounding cylinder by a passage which is tangential to the inner surface of the cylinder at the point of entry. By this means the jet of gas and compressed air is given a spiral form and a higher temperature is attained, while the durability of the furnace is increased. The idea of the spiral flame seems worthy of general adoption in furnace design.

OUR ASTRONOMICAL COLUMN.

ASTRONOMICAL OCCURRENCES FOR SEPTEMBER:

SEPTEMBER 3. 13h. 57m. Saturn in conjunction with the Moon (Saturn 6° 20′ S.).
7. 1h. 22m. Neptune in conjunction with the Moon (Neptune 5° 43′ S.).
,, 16h. 0m. Mercury at greatest elongation W. of the Sun (17° 58′).
8. 20h. 59m. Venus in conjunction with Mars (Venus 0° 30′ N.).
9. 1h. 0m. Mercury in conjunction with α Leonis (Mercury 0° 5′ N.).
,, 7h. 15m. Mercury in conjunction with the Moon (Mercury 3° 18′ S.).
11. 21h. 43m. Mars in conjunction with the Moon (Mars 0° 4′ N.).
12. 1h. 1m. Venus in conjunction with the Moon (Venus 0° 41′ N.).
16. 3h. 0m. Saturn stationary.
,, 13h. 33m. Jupiter in conjunction with the Moon (Jupiter 4° 54′ N.).
20. 15h. 13m. Uranus in conjunction with the Moon (Uranus 4° 34′ N.).
22. 22h. 9m. Sun enters Sign of Libra. Equinox.
25. 23h. 45m. Moon eclipsed, invisible at Greenwich.
30. 19h. 22m. Saturn in conjunction with the Moon (Saturn 6° 29′ S.).

The Variability of Polaris.—The confirmation of the variability of the pole star, by the selenium photometer method, is announced by Mr. Joel Stebbins in No. 4596 of the *Astronomische Nachrichten*. He observed the star for light-changes in 1904 with a polarising photometer, but difficulties prevented a definite conclusion being arrived at for so small a variation as 0·10 mag. Again in 1910 he attempted to find the variability with the selenium photometer, but meeting with difficulty in the selection of a suitable comparison star, postponed the research.